

I CLAIM:

1. A paper-flattening device for a feeding apparatus that includes a paper-supporting tray, a roller shaft, and a feed-in roller mounted on the roller shaft above the paper-supporting tray for feeding sheets of paper
5 into the feeding apparatus, the paper-flattening device comprising:

a stationary seat unit adapted to be mounted on the feeding apparatus adjacent to the paper-supporting tray;

a spindle member disposed rotatably in said stationary seat unit, and having a top end projecting upwardly from said stationary seat unit;

10 an arm member fixed on said top end of said spindle member for co-rotation therewith, projecting transversely from said spindle member, said arm member being adapted to extend over the paper-supporting tray so as to unfold the paper; and

a cam unit disposed between and coupling said seat unit and said
15 spindle member in such a manner that rotation of said spindle member in a first direction results in movement of said spindle member together with said arm member to an upper position, in which said arm member is moved away from the paper, and that rotation of said spindle member in a second direction opposite to said first direction results in movement
20 of said spindle member together with said arm member to a lower position, in which said arm member is moved toward the paper.

2. The paper-flattening device for a feeding apparatus according to claim 1, wherein said cam unit includes a cam in the form of a
25 protrusion mounted on an upper surface of one of said spindle member

and said stationary seat unit, and a helical groove formed on an outer surface of the other one of said spindle member and said stationary seat unit, said protrusion slidably engaging said helical groove.

5 3. The paper-flattening device for a feeding apparatus according to claim 2 further comprising a driven shaft that engages and drives said spindle member to rotate in said first and second directions upon being driven.

10 4. The paper-flattening device for a feeding apparatus according to claim 3 further comprising a transmission unit connected between said driven shaft and said feed-in roller.

15 5. The paper-flattening device for a feeding apparatus according to claim 4, wherein said transmission unit includes a bevel gear co-axially fixed on said driven shaft, a driving pinion adapted to be mounted on the roller shaft, a driven gear meshed with said bevel gear, a first transmission gear co-axially associated with said driven gear, and a second transmission gear disposed between meshing with said first
20 transmission gear and said driving pinion.

 6. The paper-flattening device for a feeding apparatus according to claim 5, wherein said transmission unit that includes a bevel gear co-axially fixed on said driven shaft, a driving pinion adapted to be
25 mounted on the roller shaft, a driven gear meshed with said bevel gear, a

transmission gear co-axially associated with said driven gear, and a toothed belt trained on said transmission gear and said driving pinion.

7. The paper-flattening device for a feeding apparatus according to
5 claim 6 further comprising a motor adapted to drive the roller shaft, a
sensor connected electrically to said motor to provide a first signal to
cause said motor to rotate in a third direction, and a second signal to
cause said motor to rotate in a fourth direction opposite to said third
10 direction, wherein said first signal is produced upon sensing presence of
and approach of the paper toward the feed-in roller, and said second
signal is produced upon sensing finishing of paper feeding operation and
absence of the paper in the paper-supporting tray.

8. The paper-flattening device for a feeding apparatus according to
15 claim 7, wherein said stationary seat unit includes a pair of tubular
seats adapted to be mounted respectively on two opposite sides of the
paper-supporting tray, said spindle member including a pair of spindles
disposed rotatably and respectively in said tubular seats, said arm
member including a pair of arms fixed respectively to top ends of said
20 spindles.

9. The paper-flattening device for a feeding apparatus according to
claim 8, wherein each of said spindles has an inner surface formed with
a pair of axially extending grooves, said driven shaft having two

diametrically disposed engaging tongues engaging respectively said grooves in a respective one of said spindles so as to co-rotate therewith.

10. A method of feeding a sheet of paper into a feeding apparatus
5 that includes a paper-supporting tray, a roller shaft, and a feed-in roller mounted on the roller shaft above the paper-supporting tray for feeding sheets of paper into the feeding apparatus, the method comprising:

placing the paper onto the paper-supporting tray; and

flattening the paper by the use of a paper-flattening device that

10 includes:

a stationary seat unit adapted to be mounted on the feeding apparatus adjacent to the paper-supporting tray,

a spindle member disposed rotatably in said stationary seat unit, and having a top end projecting upwardly from said stationary seat
15 unit,

an arm member fixed on said top end of said spindle member for co-rotation therewith, projecting transversely from said spindle member, said arm member being adapted to extend over the paper-supporting tray so as to unfold the paper, and

20 a cam unit disposed between and coupling said seat unit and said spindle member in such a manner that rotation of said spindle member in a first direction results in movement of said spindle member together with said arm member to an upper position, in which said arm member is moved away from the paper, and that rotation of said spindle
25 member in a second direction opposite to said first direction results in

movement of said spindle member together with said arm member to a lower position, in which said arm member is moved toward the paper.

11. A method of feeding a sheet of paper into a feeding apparatus including a paper-supporting tray, the method comprising the steps of:

5 placing the paper onto the paper-supporting tray; and
 flattening the paper on the paper-supporting tray.

12. The method according to claim 11, further comprising one step of: sensing the paper on the paper-supporting tray after the step of placing the paper onto the paper-supporting tray.

10 13. The method according to claim 11, wherein the feeding apparatus further comprises a paper-flattening device for flattening the paper.

14. The method according to claim 11, wherein the paper moves toward a feeding mouth of the feeding apparatus, and the method
15 further comprising one step of: flattening the paper prior to arriving at the feeding mouth of the feeding apparatus.